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## OUR BUILDING-STONES.

NO. I.

IN THE CRAYON of November 21, there is a short article on *Caen Stone*. The proof there given of its perishable nature, must arrest the attention of those who have used, or may think of using it for external walls. The writer does not tell us how long the process of disintegration among the buildings of Caen has been going on. Not a few of those structure are, in all probability, several hundred years old. Our impatient countrymen will say, perhaps, that any stone will answer *their* purpose, which is likely to last through the first half of *one* hundred years. Whatever may be said of private structures, such indifference in regard to the durability of materials, is most unjustifiable, when applied to those of a public character. Indeed, we can hardly believe that any wealthy citizen who has expended from \$50,000 to \$100,000, or even more, on a splendid house in the Fifth Avenue, will be pleased to learn, as our friend of THE CRAYON virtually tells them, that the solid and magnificent structure which he has taken such pains to rear, has far less chance of surviving in good condition, for a century to come, than the most common house of brick, or even of wood.

On this point—the durability of the sandstones—the statement of the writer is undoubtedly too sweeping, as we propose hereafter fully to show. For the present, we offer a few thoughts on the general subject of building-stone—a matter of vast importance—to which very little discriminative attention has been given in our country.

Though stone has been, for some time, rapidly coming into favor and use—so that now almost every building of much pretension is at least fronted with it—we are not aware that there has been any general, thorough, impartial investigation of the different kinds employed, in regard to their absolute or comparative fitness and durability. Often men fancy, or fashion determines, what stone shall be used. In many cases, and the remark applies particularly to our large public edifices, it has been made a question of private interest. The owners of different quarries compete for the prize, and that party which is least scrupulous or most wily, usually carries the day. Can anything be more ineffably absurd than to submit a question like this—a question of art and science—one that can be answered only by knowledge, skill, and care—to a committee, or still worse, to a whole body of common councilmen, or legislators, to be decided by them after a rollicking visit to the quarry—the owners being present to show the virtues of the stone, and paying not only for the ride, but also for the punch?

This important subject should be looked at, first from an economic, and then from an artistic point of view. Ease of obtaining, ease of working, strength, weight, and probable durability, are the questions which must first be settled. Looks, though a secondary, are by no means an unimportant consideration.

The stones used in building are, generally speaking, sandstones, limestones, and the granitic rocks. Of these genera there are

innumerable varieties, differing from one another, often, in very important properties.

Most people think of stone—no matter what the kind—as something nearly or quite indestructible. As a general fact, it lasts longer than they do, and they take it for granted that it will last for ever. The oldest stone structures among us are of too recent date to show the fallacy of this notion. In the old world the perishable nature of many stones is seen in thousands of buildings. Had we before our eyes similar evidences of the disintegrating power of the atmosphere, it would be far easier to convince our countrymen that there is need of careful discrimination in the selection of stone for building. Having, as yet, no experience of our own, we must use, so far as we can, that of others.

Some years ago, when the government of Great Britain was about to erect a new Parliament House, of great extent, magnificence, and cost, a commission was appointed to examine all the principal building stones upon the island. The report of this commission is the most thorough and valuable document on the subject of building-stones that has appeared in any age or country. Many of the facts and principles which it discloses are of a general nature, and are applicable everywhere. And of those which are special and local, not a few have bearings of interest, and lessons of utility for us. From this invaluable storehouse we shall draw freely.

There are two ways in which air and water, heat and frost, operate to the destruction of mineral substances—namely, disintegration and decomposition. The first is a merely mechanical division, as when sandstone crumbles into its original grains. The other is a chemical process, by which elements are resolved, and new compounds formed. As the atmosphere is the grand decomposing agent, we might know beforehand, as we actually know from observation, that climate has much to do with the matter; and that it must make a very essential difference, whether the general condition of the air be moist or dry—fresh or briny—hot or cold—calm or stormy.

The sandstones used in building are composed of quartz grains, which are held together by a cement of silicious, calcareous, argillaceous, or other matter. As these grains are all but indestructible, the durability of a sandstone depends on the nature of its cement.

The lime-stones are either simple carbonates of lime, or carbonates of lime and magnesia—sometimes nearly pure—often admixed with other matter. Their decomposition, under like circumstances, depends on the way in which their components are aggregated: those which are the most crystalline in structure, are generally the most durable, under atmospheric exposure.

Again, the sandstones having originally been formed by successive depositions from water, are often distinctly laminated. It is clearly wrong to place such stone, with the layers in a vertical position. If this be done, the penetrating and swelling moisture will probably cause the layers to flake off—a result not uncommon, which any of us may witness without going very far. A few of the *shelly* lime-stones, so

called, have a coarsely laminated structure, and need the same precaution.

We have alluded to the difference between decomposition and disintegration. The two processes, however, usually go on conjointly. So far as the surface is exposed, the air, by its chemical action, changes the entire matter of the limestones and the cementing matter of the sandstones. Fierce winds, hard rains, and frozen water act upon the substance thus impaired, and either fritter or rend it away. It is a reciprocal process. Chemical action prepares the stone to be acted on mechanically—while the mechanical action is constantly presenting new surfaces for the former.

In England, the southern, south-western, and western fronts of buildings, suffer most; these being the sides most exposed there to wind and rain.

Stone buildings in the country endure better than the same sort do in populous and smoky cities. This difference is ascribed to lichens, which, in the former situation, readily attach themselves to the surface, and grow securely. The protection against atmospheric and decomposing influences afforded by lichens (mosses, as some improperly call them), is strikingly shown by one fact stated in the Commissioners' Report. All who have seen St. Paul's Cathedral, know how much the stone in some parts of it has suffered from less than two centuries of exposure. Its mutilated, crumbling condition is lamentable to behold. The stone of which it was built, is an oolitic carbonate of lime, from the island of Portland. Near the quarries from which it came, the commissioners found blocks of stone and fragments of columns, which were got out at the same time with the stone of the Cathedral. For more than one hundred and fifty years they had lain unmoistened, and the lichens had come and covered them all over. On removing these, the stone was found to be fresh and uninjured, retaining even the marks of the chisel. Henceforth, let us regard with favor this humble, but useful, vegetation. Spare the grey and the green lichens, which Nature kindly sends, not only to preserve, but to adorn our walls.

Some idea of the extent and thoroughness of the investigation which the British commissioners made of the stones of their island, may be gathered from the following statement. The report furnishes lists of thirty-one quarries of sandstone; six of limestone; seven of magnesian limestone, and seventeen of oolitic stones. In every instance, not only are the names of place and proprietor given, but also the component parts of the stone, its color, its weight per cubic foot, the weight of block and the thickness procurable, the price per cubic foot at the quarry and in London, and the buildings in which it has been employed. Then follows a list of more than a hundred buildings, in all parts of the kingdom, in which these different stones were used. In most cases, the age of the structure and of its different portions is given. Each building was examined with the utmost care, and the precise condition of every part, whether preserved or decayed, is stated with astonishing minuteness. In another table, we have the analysis made by distinguished chemists, of sixteen varieties of stone, to which

are added their specific gravities, whether of dry masses or of particles, and, also, their respective cohesive powers.

Let us now look at some of the facts brought to our notice by this exact and impartial examination of the building-stones of Great Britain.

A comparison of the three classes, sandstones, limestones, and magnesian limestones, compels us to give the palm of durability to the last named. But, though the sandstone structures have, on the whole, suffered most, it is by no means true that all sandstones are poor. For instance, Rivaux Abbey, in Yorkshire, is a sandstone structure, which dates back at least 700 years. The stone is said to be "generally in excellent condition. West front slightly decomposed; south front remarkably perfect, even to the preservation of the original tool marks." Eccleston Abbey, in Yorkshire, was built in the 13th century. "The mouldings and other decorations, such, even, as the dog's teeth enrichments, are in perfect condition." Tintern Abbey, of the same shire and century.—"Considerable remains of red and grey sandstones, partly laminated. Of unequal condition, but for the most part, in perfect condition; covered with grey and green lichens." The circular keep at Barnard Castle, in Durham, built of sandstone in the 14th century, "is in excellent condition." Such facts abundantly prove that sandstone is not to be universally condemned, and may help to relieve us from the fear that all our buildings of that material will crumble before the year of our Lord 1955.

On the other hand, it is a fact, that there are sandstones which scarcely deserve the name of stone at all, unless it be that of *rotten stone*. Bristol Cathedral (18th and 14th centuries), was built of red sandstone and a yellow limestone, strangely intermixed. The red stone is in all cases decomposed; the lime-stone more rarely. Durham Cathedral (11th and 12th centuries), sand-stone, "in all stages of decomposition, few stones are quite perfect." St. Peter's Church, Shaftsbury (15th century). "Of a green silicious sandstone. The whole building much decomposed. The tower is bound together with iron, and is unsafe, owing to the inferior quality of the stone." At New-castle upon Tyne, there are sandstone buildings not 25 years old, which already show symptoms of decomposition. Still worse, Belper New Church, in Derbyshire, built only "10 years ago, of sand-stone from Hunger hill, is in an incipient state of decomposition."

#### THE CASTLE OF ART.

The Lord of Art, throughout his broad domain,  
Heralds to all his summoning behests,  
And Truth, the warder, at the portal rests,  
Who unto loyal vassals opens main.  
Proud of his 'scutcheon, fearing to profane  
The hallowed spot with reverence less profound,  
And to his liege in winsome fealty bound,  
He tasketh in this wise the entering train—  
"A work, an honest work, thou hast to do—  
A quenchless lamp, whose oil is love, must be  
The light to guide thy faithful footsteps through  
The chambers of his Art, if thou wouldst see!  
He welcomes all, who come in reverent guise,  
But to Deceit and Pride an interview denies."

JUSTIN WINNOR.

#### THE TRAMMELS OF ART.

"GRAF VON PLATEN."

BY JUSTIN WINNOR.

WHAT more melancholy fact than that some men of genius find it necessary, or cannot resist the impulse, to declare war against the prevailing sympathies of their Age and Country! Heine has been called the Son of his Age, but one who does not love his mother! Melancholy it is! We admit that an epoch may be characterized by monstrosities of every kind, such as are repugnant to the unnerved susceptibilities of its best children, but then shall we desert it, scold it, shut ourselves out from it, call it by hard names? Certainly a filial indulgence would be more becoming. We are not more manly, because we can clash our weapons, and cry, Come on! Discretion is, perhaps, the better part of such valor. The Times may, peradventure, have weapons equally effective, or it may prove we are over-confident both in our own strength and in the righteousness of our cause. Bacon stoically frowning upon his peers, complacently left his works and reputation to a future generation. Wordsworth walked the fields and planned poems, which he knew would not be read. This we are told is nobie. We suspect the age was not more at fault for its perverseness, than the author for his ungenial way of inculcating upon it the essence of his being. Wordsworth, the poet, fortunately, was not Wordsworth, the man; and the gentle character of the bard is proving more efficacious than the egotistical qualities of the individual. Great thinkers are seldom apt teachers of their thoughts. This is an element of their inateness. But their birth in a Christian age, their duties to their contemporaries, allow no excuse for an appearance of self-complacent wisdom, which denies open discussion, and seems to say, in the most supercilious manner, We are too good for you. Johnson was rude when he told the man, he would find him with reasons but not with brains. There is many a magnate of mind, who has treated the body of his contemporaries in a way no more flattering. The ascetic disposition of a hermit may offer many apologies, such as it could not concern the age to inquire into, but nothing can palliate the forward impertinence of an author, who debars himself from all intercourse with the world, and periodically flings his disdain upon his fellow-creatures. There is no truth about such acts. Sincerity of purpose is a phrase not to be believed in! If he can in vanity think they are not good enough for him, they have the proof that he is no fit spirit for a brotherhood of mind and a commingling of honest and ennobling aspirations. Let no such man be trusted!

Assuredly we would not have any one so blinded that he can not know the feelings of the Age he lives in. By no means. And we would have him, as energetically as he can, work for a redemption—only let it be done with a spirit of charity, a motive of universal amelioration, and a desire for Truth, sovereign Truth. Certainly, many a revolution for the better, began thus, can be more rapidly accomplished than by a manifestation of disdain, and a clutch of the hand. The fortress of Untruth will fall more easily before the sappers and miners of unobtrusive perseve-

rance, than before the simultaneous outbursts of infuriated assaults.

Just such a quietly sure conquest is this new band of Pre-Raphaelites at present consummating. The Sphere of Art is undergoing, under its renovating influences, a change, gradual though it be, which is as sure as the effects of centuries on the globe. The mightiest results are to be prognosticated from this very stillness of its advance. It is not the tumultuous uproar of a volcanic power that alone can leave a trace of the most stupendous changes. Gradually, for centuries, has the water worked its channel through the hills, and the dissipation of the lake in the depths of the ocean is accomplished at last. The ways of Nature are insinuating, but sure. The barren stubble-field becomes a forest. Oh, there is a grandeur about this that we do not fully feel! The sweeping flames, mantling the summit of a majestic forest, till, crash after crash, the lordly race fall one by one, and lie a blackened heap upon the scene of desolation—is a picture of terrific sublimity. But the other, the seed in the earth, the sprout above the ground, the gradual growth, the mounting of the sap, the extension of branches, and this in a myriad of cases, till they form the magnificent wood, poetic with nooks and glens, haunted with spirits, that the imagination bodies forth, useful in the materials that serve mankind in the building of navies and towns—this is the other, and has it not a grandeur to the mind that surpasses the mere, as it were, momentary sublimity of the conflagration, and all the more, considering the centuries gone and going on for the working of this stupendous marvel? If Nature herself takes such a length of time to produce such an abundance from the fruitless heath, such magnificence from the waste, surely her faithful worshippers and the guardians of her Truths, are not to be daunted in the outset. Trustful nurslings in the lap of Nature, they await the beckoning finger of the Age, and earnest and reverential in their filial regard, they are not disdainful of those who claim another mother. If Tradition fosters her children with the precepts of the Great, they have no common nutriment, and essay no unwonted things. There should be no enmity, as there is no diverseness of purpose, between the two. Mankind acknowledges the kindly intentions of both. They walk in different paths, but let us hope the time is not far distant when these already converging ways may become united in one, leading to undreamt excellence, in a region of perennial beauty, where Nature and tradition, divested of all unharmonious thoughts, and clothed with the sanctity of a religious ordering, shall jointly welcome the artist and his friends.

We do not like either geographical or chronological lines in the World of Literature and Art. The influence of schools is pernicious, and we see too much of it in Pre-Raphaelism, as it exists at present; but in the state of which it is the precursor, when we trust the name of school will be no longer, if such a thing is possible, in that neutral ground of Nature, where only her trusty priests can exercise a sway, vested in them by the master-spirits of all ages—on such a state we look for the noblest regeneration of Art, and if ever the aspirations of struggling humanity can find